

THE MINE RESISTANT AMBUSH PROTECTED VEHICLE, A CASE STUDY

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USAWC STRATEGY RESEARCH PROJECT

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ABSTRACT

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Rapidly evolving force structure requirements driven by transformation and urgent operational needs originating from combat bring into question the Defense industrial base's ability to respond rapidly to quickly changing requirements. The rapid acquisition of the Mine Resistant Ambush Protected (MRAP) vehicle, one of the largest material acquisition programs since World War II, provides an excellent review of the challenges to industrial base agility in today's wartime environment. Even though identified as an urgent need and given the highest development priority by the Secretary of Defense, the abbreviated MRAP development cycle exposed weaknesses in Defense acquisition – industrial base partnership. This case study analyzes the statutory and commercial constraints, and evaluates the remedial government and business actions taken. From this data it draws conclusions as to whether or not today's industrial base is up to the task of providing effective and timely support for national defense requirements.

THE MINE RESISTANT AMBUSH PROTECTED VEHICLE, A CASE STUDY

Introduction

During the cold War, the United States' industrial base possessed the depth and breadth to adjust to changes in force structure and evolving equipment demands placed on it by the Department of Defense (DoD). In the static bi-polar cold war world, the DoD established a system of procurement and acquisition that supported long term weapons projects that were generally not emergency or immediate requirements. Weapons development and production runs lasted years, and in some cases, like the M1 main battle tank, for decades. Today, material demands are often generated by a Geographical Combatant Command (GCC) or Service generated urgent operational need to field a piece of equipment to the operational force. It is not uncommon to see urgent operational needs generated by commanders in combat from Operation Enduring Freedom (OEF), or Iraqi Freedom (OIF) or other contingency operations that result in immediate requirements for industry to ramp up production of new or existing systems. As a result, today DoD is reliant on a flexible agile industrial base to support rapid fielding of equipment to fill those needs.

On November 9th 1989, the Berlin Wall fell, the Soviet Union declined and the cold war ended shortly thereafter in August 1990. However, DoD continued to use the same acquisition models and much the same doctrine that existed at the end of the cold war. The industrial capacity of the United States was able to produce such weapons and systems as the M1 main battle tank, the High Mobility Multipurpose Wheeled Vehicle (HMMWV), the Stealth Fighter and Bomber and other weapons and vehicle systems within its capacity. Generally, weapon systems took years in design, testing

and evaluation before full scale production, allowing for industry to incrementally plan increasing capacity over time. In the post Cold War era the industrial capacity of the United States continued to shrink as the nations manufacturing jobs and industry migrated out of the United States and into Canada, Mexico and Asia. Meanwhile the economy of the United States slowly evolved into a more service oriented economy. In the United States, the land combat systems (LCS) sector continued to contract with some companies leaving the defense industry altogether. Further, through mergers and acquisitions the U.S. was left with few domestic LCS manufacturers.¹ However, The Department of Defense and the Army continued to train, equip and man organizations to prepare for high intensity conflict. The situation changed on September 11th 2001 when Al Qaeda attacked the World Trade Center and the Pentagon using commercial airliners as weapons. The United States shortly thereafter entered Afghanistan in October 2001 and later initiated Operation Iraqi Freedom in March 2003. After the invasion of Iraq the military found itself without the proper training or equipment either for effective phase four operations or counterinsurgency operations.² This raised the question: Is the United States industrial base capable of reacting to rapidly changing force structure requirements? The Mine Resistant Ambush Protected (MRAP) acquisition is an excellent case study to explore this question. The MRAP rapid acquisition is nearly the largest and fastest land combat systems program since World War II.³ It involves a rapid requirement, sudden expansion of industry, management of limited resources, DoD acquisition priorities management and statutory limitations on sources of suppliers and material. Additionally since MRAP involves both existing manufacturers and new producers, the effect on industry can be examined.

The MRAP as an Urgent Requirement

The MRAP is a V-shaped hull, four or six wheeled vehicle that is designed to deflect the effects of a blast from a land mine detonation up, out and away from the crew compartment, thereby increasing the survivability of the crew. Additionally, the MRAP crew compartment sits higher off the ground further reducing blast effects. According to Air Force Lt. Col. Bob Harris, an acquisition officer at Hanscom Air Force Base, "The advantages the MRAP had on the HMMWV were clear. It's a simple formula, a vehicle that's 1 foot off the ground gets 16 times that (blast) impact that you get in a vehicle that's 4 feet off the ground like the MRAP."⁴ The V shaped hull design used on the MRAP is not entirely new technology as the South African military has used the concept since the 1970s.⁵ The U.S. Army and the Marine Corps had procured limited MRAP variants prior to OIF for intended uses primarily by explosive ordinance disposal teams. Many of these early MRAP vehicles were bought from South Africa in limited numbers to outfit these specialized teams.

When the United States entered Afghanistan and Iraq, the primary wheeled vehicle in use during operations outside of the relative safety of forward operating bases and outposts was initially the standard M998 variant HMMWV. The single largest threat and greatest casualty producer to Soldiers and Marines in both theaters became the use of improvised explosive devices (IED). The HMMWV is designed to be a troop and cargo carrier and was never designed to counter an IED threat. The vehicle did not perform well in IED strikes due to its flat surfaces and flat underside which causes little blast deflection when an IED detonates near it. As IED use and lethality increased in both OEF and OIF the defense establishment's reaction was to add non-standard plate armor to existing M998 HMMWV's and to speed production of up-armored HMMVWs

including retrofit of M998's into up-armored HMMWVs using various forms a fragmentation kits. However, this did not mitigate the flat surfaces both on the sides and underbelly of the vehicle which did not efficiently dissipate the blast effects of an IED. As early as December 2003, the Defense Department was increasingly concerned by the mounting toll in Iraq due to IED strikes. DoD began to explore options for better protecting troops.⁶ In February 2005, Brigadier General Dennis Hejlik, Deputy Commander of the 1st Marine Expeditionary Force sent an urgent needs statement for over 1600 MRAP vehicles for use by the Marines in Anbar province Iraq due to increased enemy use of rocket propelled grenades and IEDs “requires a more robust family of vehicles.”⁷ The urgent needs statement was sent to Marine Corps Combat Developments Command which in turn shelved the urgent needs statement.⁸ As congressional interest and the public grew more and more concerned with the high number of casualties due to IED strikes in Iraq and Afghanistan, the MRAP acquisition began to receive more and more interest both within DoD and Congress. In response to a validated U.S. Central Command Joint Urgent Operational Need Statement (JUONS), the MRAP program office was created on November 1, 2006.⁹ Subsequently, the acquisition of the MRAP became a major DoD program in February with the Navy designated the Executive Agent.¹⁰ A JUONS is defined as “an urgent operational need identified by a combatant commander involved in an ongoing named operation. A JUONS main purpose is to identify and subsequently gain Joint Staff validation and resourcing of a solution, usually within days or weeks, to meet a specific high-priority combatant commander need. The scope of the combatant commander JUON is limited to addressing urgent operational needs that: (1) fall outside of the established service

processes, and (2) most importantly, if not addressed immediately, will seriously endanger personnel or pose a major threat to ongoing operations.”¹¹ Senator Joseph R. Biden, Jr. (D-Del) wrote a letter to Secretary of Defense Robert M. Gates in May 2007 urging the Defense Department to make the MRAP acquisition a priority for the Department. On May 30th 2007 Secretary Gates directed the establishment of an MRAP Task force with the edict of getting “as many of these vehicles to our Soldiers and Marines in the field as is possible in the next several months.”¹² In April 2007 the United States Marine Corps awarded a \$481 million contract to Force Protection Industries for 1000 new MRAP variants.¹³ However, as late as May 2007 the Army had still not selected a MRAP model but had awarded contracts to nine companies to supply thirty-six initial prototypes for testing at Aberdeen Proving Ground, Maryland.¹⁴ On May 10th 2007 the Joint Requirements Oversight Council (JROC) approved a total acquisition of 7,774 MRAPs; 3,000 for the Marine Corps, 2,500 for the Army, 544 for the Navy, 697 for the Air Force and 333 for Special Operations Command. The Acquisition of the MRAP is managed by the Marine Corps Systems Command in partnership with the Army.¹⁵ According to Jane’s Defence weekly, the seven companies awarded contracts for MRAP production were; Force Protection, International Military and Government, a subsidiary of Navistar International Corporation, BAE systems, Armor Holdings, General Dynamics Land Systems Canada, Oshkosh Truck, and Protected Vehicles Incorporated.¹⁶ Specific orders by corporation are depicted in table one.

MRAP TYPE BY MANUFACTURER

	MRAP TYPE		
	I	II	III
MANUFACTURER			
Force Protection	1263	642	58
International Military and Government	1955	16	
BAE	201	330	
General Dynamics Land Systems	610	10	
Osh Kosh	100		
Protected Vehicles	60		
Armor Holdings	1154	16	

Table 1¹⁷

Throughout the remainder of 2007 and beginning of 2008, DoD continually placed orders for all variants of MRAP vehicles with an overall objective fielding of 15,374.

This number includes theater requirements as well as test and evaluation vehicles.¹⁸

MRAPs are produced in three variants. Table two displays the characteristics of the three variants, including crew size, weight, common missions, names and number of axles.

CHARACTERISTICS OF MRAP VARIANTS

	CREW SIZE	WEIGHT IN TONS	AXLES	MISSION	COMMON NAME
TYPE					
TYPE I	6	7 TO 15	4	Troop Transport	RG33 4x4
TYPE II	10	15 TO 25	6	Convoy Escort EOD Teams	RG33L 6x6
TYPE III	6	25	6	Route Clearance	Buffalo

Table 2¹⁹

Production Ramp Up

In May of 2007, the U.S. industrial base contained only one “warm” production line for MRAPs. That line belonged to Force Protection Incorporated who supplied DoD with

the MRAP vehicle destined for EOD teams.²⁰ As demand for MRAP production grew exponentially in mid to late 2007, manufacturers of MRAPs had difficulty expanding their manufacturing capability to meet the Pentagon's demands. Competition among resources for use in the MRAP assembly became a limiting factor in production rates. Items such as high grade steel, tires, qualified suppliers, hiring and training employees were seen as potential impediments to the aggressive MRAP production schedule.²¹ According to the Honorable John J. Young, Jr., Director Defense Research and Engineering, "We may encounter manufacturing, spare parts, and maintenance issues as we accelerate...this is an extremely aggressive program and the Defense Department is accepting risk"²² With the quick production ramp up going from one warm production line to seven active production lines in a period of months, DoD realized there could be potential industrial and resource capacity issues that could hamper the aggressive timeline for MRAP production and fielding that DoD sought.

As DoD pursued an aggressive production schedule, manufacturers began to hire and train employees, expand their production facilities and qualify suppliers. The process of hiring and training personnel to build the MRAP can not be accomplished within weeks. It takes considerable amount of time to properly train the labor pool to manufacture heavy military vehicles. Additionally some personnel involved in management and production require security clearances to be able to work with DoD specifications on armor plate.²³

Preparing the Industrial Base

As the MRAP acquisition process gained momentum, DoD was concerned about the capacity of industry to produce the MRAP in the quantities and speed requested. Of

particular interest to DoD officials were armor steel plate and tires.²⁴ According to a statement by Mr. Young, Jr. before the Subcommittees on Sea Power and Expeditionary Forces and Air and Land Forces of the House Armed Services Committee given on July 19th 2007, the Department took several actions to evaluate and mitigate any industry shortfalls that arose from the MRAP ramp up.²⁵ As stated previously, Secretary Gates established the MRAP task force on May 30th 2007 with the mission to get as many MRAPs to theater as soon as possible. With industry capacity pegged at ten MRAPs per month in December 2006, Mr. Young, Jr. credits partnerships between the government and industry as being the key to success in getting MRAP production accelerated. According to testimony, industrial producers acquired MRAP production resources, at risk to themselves, prior to receiving any official orders for MRAPs.²⁶ Further, in his statement to the Committee, Mr. Young, Jr. states, "Our near term goal is to purchase and take delivery of as many MRAP vehicles as industry can produce during calendar year 2007. Thus, our near term plan is based on industrial capacity."²⁷ The MRAP program produced difficult challenges to both the DoD acquisition systems and industry. Determining that materials for production of MRAPs were in competition with other defense procurement programs, Secretary Gates assigned the MRAP program the highest possible priority rating for a defense acquisition in June 2007. He assigned the MRAP a DX rating which provided for priority of supply of resources over demands for the same resources by other programs.²⁸ Applying the DX rating to the MRAP put it in a class with high priority Pentagon programs including the Trident ballistic missile and Presidential helicopters.²⁹

According to the Federal Acquisition Regulation (FAR) Subpart 11.6-priorities and Allocations, "there are two levels of priority for rated orders

established by the Defense Priorities and Allocations System (DPAS), identified by the rating symbols “DO” and “DX.” All DO rated orders have equal priority with each other and take preference over unrated orders. All DX rated orders have equal priority with each other and take preference over DO rated and unrated orders. DX ratings are used for special defense programs designated by the President to be of the highest national priority.”³⁰

However, many defense analysts contend that assigning the DX priority was a largely symbolic move designed to reassure Congress that DoD was fully committed to an aggressive MRAP acquisition strategy. Skeptics contend that assigning a DX priority does not in itself increase industrial capacity.³¹ Assigning a DX priority only allows suppliers to meet their contractual requirements to supply a DX rated program. Additionally, manufacturer’s can use the DX priority to purchase production machinery at a higher priority. A DX rating only applies to materials and equipment supplied from within the United States.³²

To effectively allocate resources among various DoD programs competing for similar resources, DoD convened a Priority Allocation of Industrial Resources (PAIR) Task Force. The PAIR Task Force is comprised of members from the Joint Staff, Office of the Secretary of Defense and procurement activities. Its mission is to evaluate resource requirements among all DX priority projects, compare those requirements with availability of those resources and where appropriate provide prioritization of resources among various programs.³³

High Grade Steel

While the MRAP Task Force was evaluating potential industrial resource constraints that could limit MRAP production, they identified the availability of armor steel plate as a potential constraint. In July 2007 the Defense Department foresaw the

shortfall and developed a course of action that involved acquiring and storing steel plate to be used in the MRAP production in preparation for industry to ramp up their production lines.³⁴ This was done to provide steel for the MRAP production lines, and also preserve steel for other DoD programs, including shipbuilding.³⁵ There are only two manufacturers of high grade steel in the United States qualified to produce the armor steel specified for use in MRAP production.³⁶ Oregon Steel Mills Inc. located in Portland Oregon and International Steel Group based in Richfield Ohio. Both of these mills have been acquired by foreign companies in the past year and a half. Oregon Steel is now owned by Evraz Group S.A. of Russia. International Steel Group was acquired by the Dutch conglomerate Arcelor Mittal.³⁷ Foreign ownership of U.S. defense manufacturers brings unique challenges to DoD acquisition. In many cases priorities of foreign companies may not match U.S. defense industry needs. The potential for policy differences between the U.S. and foreign companies may cause differing prioritization of production between DoD and the foreign corporations. To further complicate the steel issue Oregon Steel and International Steel are the same production facilities providing high grade steel for use in various DoD weapons programs. These programs included four variants of the Route Clearance Vehicle (RCV), the Stryker, the Bradley Fighting Vehicle (BFV), the Armored Security Vehicle (ASV) and the HMMWV.³⁸ Restrictive acquisition laws hampered steel availability as well. Under the Buy American Act of 1933, the government is mandated to provide preference for the purchase of domestically produced goods over foreign goods in U.S. government procurement actions.³⁹ Additionally, the Berry Amendment contained in Title 10 United States Code. Section 2533b requires DoD to provide preference in

procurement of food, clothing, certain specialty metals and other goods.⁴⁰ Section 2533b contains exceptions, one of which allows for use of non-domestic sources in support of combat operations or contingency operations. In order to remedy this constraint, in May 2007, Dr. Delores Etter, the Navy Acquisition Executive determined that this exception applied to MRAP vehicles supporting ongoing contingency operations in Southwest Asia and the Middle East; and that the exception also applied to MRAP vehicles not for use in the combat theaters but for use in vehicle testing and vehicle operator or troop training.⁴¹

The exception to use foreign sources of steel invoked by Dr. Etter applied to the steel for use in the MRAP production, not steel plate for use in explosively formed penetrator armor kits destined for use on MRAP variants.⁴² Secretary of the Army Pete Geren notified the House Appropriations Committee that pursuant to Public Law 109-289, the Department of Defense Appropriations Act of 2007, section 8024, that the demand for high grade armor steel plate from U.S. or Canada exceeded the capacity for these sources to produce these armor kits. In his memorandum Secretary Geren certified to congress this fact and notified Congress that for the period of September 2007 through December 2008 DoD would seek sources of high grade armor steel plate for use in these programs from foreign sources.⁴³

In November 2007, armor plate and high strength steel plate continued to be a constraint to full MRAP production goals. The total defense requirement across all programs for this special grade steel is about 21,000 tons per month.⁴⁴ This seems small when we find that the total United States capacity for steel production is 8,000,000 tons per month.⁴⁵ However the special steel for use in vehicles designed to defeat IEDs

is a very small percentage of that overall production. The vast majority of those 8,000,000 tons is intended for commercial use, industrial manufacturing and construction.⁴⁶ When Mr. Young, Jr. testified before Congress in November, he stated that domestic capacity for high grade steel production for use in DoD programs was 8,400 tons per month when the MRAP program began.⁴⁷ Through efforts such as slight steel specification changes, the notification to Congress that foreign suppliers would be used for MRAP production and the production of EFP armor kits, supply of high grade steel was 20,900 tons per month in November 2007.⁴⁸ Just short of the 21,000 tons per month total DoD requirement with one stated caveat. In his statement before the Committee, Mr. Young, Jr. states, "This supply essentially meets our demand. Pending finalization of steel requirements for MRAP explosive formed penetrator armor kits, we project that there will be sufficient steel production capacity to ensure all DoD programs are able to continue to provide critical equipment to our Soldiers, Sailors, Airmen and Marines."⁴⁹

Tires

In July 2007, industry capacity to produce the low class, low rating tires required for use on the MRAP was limited to 1000 tires per month by one manufacturer, Michelin.⁵⁰ With a December 2007 goal of producing 1300 MRAPs per month the MRAP program would require 6000 tires per month.⁵¹ In response, the Department of Defense transferred 4.0 million dollars to the Defense Logistics Agency to buy additional tire molds to facilitate an increase in production of MRAP tires. In testimony before the before the subcommittees on Seapower and Expeditionary Forces and Air and Land Forces of the House Armed Services Committee on November 8th 2007, Mr. Young, Jr.,

testified that Goodyear was now a second producer of MRAP tires.⁵² With the addition of the second tire producer as well as additional molds, production would increase to about 17,000 tires per month by January 2008.⁵³ This production rate is assessed as being sufficient to meet the demands of new production MRAPs, as well as fill requirements for spares and replacement tires for MRAPs already in use. Through combined efforts of industry, DoD and various Defense Agencies, MRAP tire producers overcame the initial tire constraint.

As a result of intensive management efforts by DoD and industry partners the MRAP exceeded the DoD delivery goal of 1500 by delivering 1525 MRAPs to Iraq by the end of December 2007.⁵⁴ As of January 16th 2008 according to DefenseLink, 2225 MRAPs had been delivered to theater.⁵⁵

From Factory to Finished Combat Ready System

Production ramp up is only one piece in the supply chain that eventually leads to a Soldier or Marine utilizing the MRAP in combat. Once an MRAP is delivered to the military, there is an extensive process of installing government furnished equipment (GFE). GFE includes radios, Counter IED Radio-Controlled Electronic Warfare (CREW) devices, blue force tracker (BFT) and intra-vehicle communications systems.⁵⁶ DoD established a central GFE process as the final step in producing a combat ready MRAP ready for delivery to Iraq or Afghanistan.

GFE

The first challenge in overcoming the government furnished equipment issue was to get the Army and Marine Corps to agree on a common baseline for equipment. In November Mr. Young, Jr. testified that the services had agreed to a common baseline

for GFE that each service could deviate from.⁵⁷ Additionally, since MRAPs are being produced by multiple vendors with multiple models, the installation of GFE was further complicated. DoD designated the Space and Naval Warfare Systems Command (SPAWAR) facility in Charleston, South Carolina as the central DoD facility for GFE installation on the MRAP vehicles. Over time through working with MRAP manufacturers, SPAWAR was able identify modifications in the manufacturing process that would speed daily throughput at the SPAWAR GFE facility.⁵⁸ Industry was receptive to these minor modifications and implemented these into production, allowing the GFE installation process to be streamlined.⁵⁹ In November Mr. Young, Jr. testified that SPAWAR was working towards reaching its goal of 50 vehicles per day at the GFE facility.⁶⁰ On January 18, 2008 Armed Forces Press Articles reported that the SPAWAR facility had reached its goal of completing GFE installation on 50 MRAPs a day on December 5th 2007 and is now up to 62 fully furnished GFE MRAPS per day.⁶¹

Effect on Industry

Now that the MRAP production run is nearing an end we can examine the effects or possible effects the program had on the LCS industry. The MRAP rapid acquisition was nearly the largest and fastest land combat systems program since World War II.⁶² As an illustration of how quickly the MRAP program was implemented, LTG Stephen Speakes, the Army Deputy Chief of Staff, G8 told the Wall Street Journal that it took the Defense Department five years in the 1980s to develop the HMMWV. It took industry and DoD less than a year to build and ship 1,700 MRAPs to Iraq.⁶³ Congress appropriated over 28 billion dollars in supplemental funding for the MRAP program over Fiscal year (FY) 07 and FY08 for the total acquisition objective of over 15,000 MRAP

vehicles. Recently, the U.S. Marine Corps cut its vehicle requirement from 3700 to 2400 vehicles. The additional 1300 vehicles will be used by the Army so the overall production run remains the same. Marine Corps Commandant, General James T. Conway reasoned that the need to keep the Marine Corps light and the improving conditions in Iraq as justification for reducing the order.⁶⁴ As an example of effects on industry, when Force Protection Inc. secured orders for 3000 MRAPs its stock value originally rose and is currently falling. Stock prices are currently valued at \$4.83 a share down from its high in May 2007 of \$31.16 per share.⁶⁵ Revenues for the company rose from 10 million dollars in all of 2004 to \$206 million in the third quarter of 2007.⁶⁶ However, analysts expect revenues to decline as well as the MRAP program nears an end.⁶⁷ Force Protection Inc. predicts the company will survive after the U.S. government MRAP buy is complete. They will attempt to sell the MRAP to foreign governments and begin to venture into MRAP sustaining activities such as producing spare parts for the military's MRAP vehicles.⁶⁸ According to Brigadier General Michael Brogan, Commander of the Marine Corps Systems Command, the MRAP program will most likely come to an abrupt end; the program will not taper off.⁶⁹

White Elephant

Is the U.S. military going to be left with a white elephant, a material solution to the IED problem, once the fielding of the MRAP is complete and Iraq begins to stabilize? The MRAP acquisition calls into question the usefulness of the MRAP at a time when the strategy in Iraq changed into a classic counterinsurgency. The strategy changed to having troops spend less time on forward operating bases (FOB) and increase contact with the people of Iraq. The acquisition of the MRAP is potentially counter to that

strategy with its high ground clearance, size, security and isolation of the crew. The MRAP came as troops were being dispersed off of the large central FOBs into company and team sized bases to maximize contact with the civilian populace. In this tactical environment some have criticized the MRAPs usefulness.⁷⁰ However, according to Infantry Magazine there is room for MRAPs in table of organization and equipment (TO&E) units post Iraq.⁷¹ MRAPs can be used in all types of modular brigade combat teams. MRAPs can be useful in the brigade support battalion (BSB) forward support companies (FSC) as a combat logistics patrol escort platform. As a former Infantry Brigade Combat Team (IBCT) BSB commander I can attest to the need for this capability. As we trained in preparation for deployment to Afghanistan, convoy escort gun truck training was essential. We had to convert M998 cargo HMMWVs into gun trucks for training due to the fact that the IBCT BSB TO&E contained no security vehicles.

MRAP has potential for use as scout/reconnaissance vehicles in the brigade reconnaissance, surveillance, and target acquisition (RSTA) squadrons and battalion scout platoons.⁷² The BSB and medical platoons can replace their unarmored field ambulances with the medical evacuation configured MRAP and the MRAP has potential for use as command and control vehicles.⁷³ It is too early to tell if the military has acquired a vehicle for use in the IED problem set in OIF and OEF and is left with vehicle it cannot use post OIF/OEF. I believe there is room in the Army BCTs for the MRAP post Iraq. Additionally, engineer units and EOD units had and will have the need for the MRAP. However, the Marine Corps Commandant wanting to maintain the

expeditionary flavor of the Marines has said, "What are we going to do with MRAPs in five to 10 years? Put them in shrink wrap and set them on asphalt, is my guess."⁷⁴

Conclusions

The MRAP acquisition was a massive effort on the government and industries part to begin one of the largest and fastest LCS acquisitions since WWII. Congress appropriated the required funds for the MRAP program in a timely manner and is expected to continue support for this acquisition and others that fill an urgent need for the military in combat. The defense department was active in the analysis of the resources available to produce MRAPs and was able to use authorities granted in law to open new sources for raw materials specifically foreign sources for high grade steel. This helped alleviate competition amongst multiple DoD programs for scarce resources. Although the original lofty goal of 4000 vehicles in theater by the end of 2007 was not met, as data on resources and manufacturers became clearer DoD established a readjusted goal of 1500 vehicles in theater by the end of the 2007, a goal which the department and industry met and slightly surpassed. Additionally, the tire constraint was remedied rather early by adding a producer and buying molds for the tire manufacturers. DoD realized that after the MRAPs were produced the task to outfit MRAPs with GFE was solely a DoD responsibility. Through gaining the Army and Marine Corps agreement on semi-standard GFE configurations, and the establishment of a central GFE installation facility at SPAWAR, DoD was able to streamline this process and is now installing GFE on more that 50 vehicles per day. Once MRAPs depart SPAWAR they are Combat ready for delivery to units in Iraq and Afghanistan.

Are the Army and Marines fielding the MRAP to fill a niche capability today and spending valuable resources on a piece of equipment that it will not have a use for in the future? The answer to that question is unclear at this time. However doctrine developers should be cognizant of the fact that the military will eventually have over 15,000 MRAPs in units and should be analyzing potential uses for the vehicle in full spectrum operations doctrine. Industry appears at the time of this paper to realize that the MRAP program will abruptly end once production and delivery numbers are met. They are planning for viability of their corporations after MRAP by diversifying into MRAP sustaining activities and potential foreign sales of the MRAP. Nick Chabreja, CEO of General Dynamics expects the MRAP program to “go away” and he expects other domestic and foreign defense sales to help make up for the drop off.⁷⁵

The central question this strategic research project examined was; is the United States industrial base capable of reacting to rapidly changing force structure requirements? In order to evaluate that question, this paper used the Mine Resistant Ambush Protected (MRAP) acquisition as a case study.

With meticulous management and resource prioritization within DoD, timely Congressional appropriations, and industry expansion and partnering with government, the industrial base of the United States expanded and met requirements of the MRAP urgent needs statement. Does the MRAP case foretell future success? Only if lessons learned are institutionalized and integrated into future urgent needs response strategies. However as U.S. industry continues to evolve DoD should examine its industrial policy in general to ensure a viable U.S. defense industrial base that is able to respond to evolving material demands.

Endnotes

¹ U.S. Industrial College of the Armed Forces, National Defense University, *Industry Study: Final Report: Land Combat Systems Industry* (Fort McNair, Washington, D.C.: ICAF, Spring 2007), 5.

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